

**Lab Assignment 5****Due 2030****Lab Grading Policy: Attendance 20%, Score 80%**

In case you have difficulty in finishing the exercises on time, you should upload them before **noon on Sunday** and a penalty of 20% discount will be applied on your score. No late submission is permitted. We will in general post the reference solutions **by Monday**.

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**Exercise 1 (30%):** Write a program that allows users to continue input an integer and print them with commas if they have more than three digits. For example, -2036 and 123456789123456 would be printed as -2,036 and 123,456,789,123,456, respectively. Use ! to terminate the input.

```
Enter an integer (! to quit): -2345
The integer with comma is: -2,345
Enter an integer (! to quit): 123
The integer with comma is: 123
Enter an integer (! to quit): 12345678901234567890
The integer with comma is: 12,345,678,901,234,567,890
Enter an integer (! to quit): !

Process returned 0 (0x0)   execution time : 19.937 s
Press any key to continue.
```

**Exercise 2 (50%, erase in a list):** A prime (質數) is an integer greater than 1 and divisible only by itself and 1. The Greek mathematician Erathosthenes gave a very simple algorithm for finding all prime numbers less than some integer N. It works like this: begin with a list of integers 2 through N. The number 2 is the first prime. The multiples of 2 (for example 4, 6, 8 etc.) are not primes and should be removed from the list. Then the first number after 2 that has not been removed from the list is the next prime. This number is 3. The multiples of 3 are not primes (for example 9, 15; notice that 6 and 12 have already been removed from the list). The algorithm continues this fashion until we reach N. All the numbers remained in the list are primes.

Write a C++ program that allow the users to supply N. Use a `list<int>` to store integers 2 through N and use its member function `erase` to remove the numbers that are not primes. A sample run looks like:

```
Please input the number, N: 30
Original data:
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
After erasing with the base "2":
2 3 5 7 9 11 13 15 17 19 21 23 25 27 29
After erasing with the base "3":
2 3 5 7 11 13 17 19 23 25 29
After erasing with the base "5":
2 3 5 7 11 13 17 19 23 29
After erasing with the base "7":
2 3 5 7 11 13 17 19 23 29
After erasing with the base "11":
2 3 5 7 11 13 17 19 23 29
After erasing with the base "13":
2 3 5 7 11 13 17 19 23 29
After erasing with the base "17":
2 3 5 7 11 13 17 19 23 29
After erasing with the base "19":
2 3 5 7 11 13 17 19 23 29
After erasing with the base "23":
2 3 5 7 11 13 17 19 23 29
After erasing with the base "29":
2 3 5 7 11 13 17 19 23 29
The primes within 30 are listed in the following:
2 3 5 7 11 13 17 19 23 29
請按任意鍵繼續 . . . ■
```